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be overcome. The whole of the operations of forming the strip into the finished tube are accomplished in one continuous process by a single machine. The weight of the various sizes of tubing now manufactured ranges from  $2\frac{1}{2}$  ounces per foot for the  $\frac{5}{16}$ -inch tubing, which is the smallest size manufactured, up to 17 ounces per foot for the  $1\frac{1}{2}$ -inch tubing.

#### LETTERS TO THE EDITOR.

\*\*\* Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.

On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.

The editor will be glad to publish any queries consonant with the character of the journal.

#### Zoology in the Public Schools of Washington, D.C.

IF there be one thing clearer than another to all thinking people of this or of any other highly civilized nation at the present time, it is that we are living in an age of great scientific progress. Among the dominant, most highly cultured races of the world this progress is characterized by its great rapidity, the exactness of its methods, and its far-reaching influence. It extends into all departments of human activity; it is felt along every imaginable line, both where the ends and aims are of a most utilitarian kind, as well as in quarters where the results arrived at appear to be, for a time, of a most impracticable nature. Solutions of abstract questions solved by the scientific philosopher and student, no longer, as of old, remain for an indefinite period hidden in an inaccessible literature, but quickly see the light in many places, and, in an incredibly short space of time, appear in the general literature of the day, in school and college text-books, and even in the daily newspapers. This being true, it was with no scant measure of surprise that the present writer had brought to his attention, very recently, a most remarkable case of misinstruction on the part of one of the teachers in a public school of Washington. It is no more than fair to say, however, that the statement made by the instructor to whom reference is made is supported by the author of one of the text-books in general use by the public schools throughout the District. The book in question is Mr. William Swinton's "Grammar School Geography," and in that production the author has adopted the plan of asking a series of questions, and then printing the replies to them on one of the maps given in illustration. On page 71 of his geography he asks, "What fish are taken in the Arctic region?" and on the accompanying map leaves the student to choose among a number of forms there given, none of which are fish, however, but where prominently occur such animals as the whale and the narwhal,—both of the last-named being typical and well-known marine mammals.

One of my sons attends the school to which allusion has been made, and it fell to his lot to get this question, and in making answer stated that no fish were named on the map in the Arctic regions; whereupon the teacher contended that both whale and narwhal were fish,—“and very big ones, too,”—directed him to take his seat, marked the reply against him as a miss, and appeared to be well pleased that the next scholar in turn replied more in keeping with his own notions in the premises, by stating that two large fish, at least, were found in the Arctic regions, and cited the two that have just been named. Now if there be one fact that zoology has made clearer than another, and it has been given in all authoritative lexicons, encyclopædias, and text-books throughout the world, it is that both the whale and narwhal are, as has been said, typical marine mammals, and belong just as much to the class Mammalia as does a man or a bear.

The believing that the whale is a big fish carries us back almost to the time when people entertained such erroneous conceptions of the earth and the creatures that live upon it, that it was popularly thought that the former was flat, that bats were birds, and horse-hairs could be converted into living hair-worms. My surprise is so great indeed at such a state of affairs existing in these times in our very midst that it absolutely forbids my making any comment thereon for fear that language might fail me to do the matter justice. It is surely high time that some effective course in ele-

mentary biology be included in our public school curriculum, and the sooner it is done, the sooner will our children come to be familiar with common facts, the true nature of things as they exist, and learn to appreciate the significance of a long-exploded idea when they meet with it.

R. W. SCHUFFELDT.

Washington, D.C., April 4.

#### The Question of the Celts.

DR. BRINTON, in the last number of *Science*, asks Dr. P. Max Foshay for evidence upon certain suggested points, and now I should like to follow his example, and ask Dr. Brinton for his evidence that Dr. Theodore Köppen “repeats the familiar error of attributing the theory of the origin of the white race in Europe to Dr. Latham; whereas, long before he mentioned it, it had been urged with clearness by Omalius D’Halloy, the distinguished Belgian anthropologist” (*Science*, vol. xix., p. 174). Both Otto Schrader, “Prehistoric Antiquities of the Aryan Peoples” (Jevons’s translation), p. 85, and Canon Isaac Taylor, “The Origin of the Aryans,” p. 20, agree in assigning this distinction to the late eminent English philologist, as propounded by him in “*Thé Germania* of Tacitus, with Ethnological Dissertations and Notes,” London, 1851, Epilgomena, p. cxxxix. (now before me). Will Dr. Brinton refer me to the work of “the distinguished Belgian anthropologist,” and inform me whether he is in any way related to the distinguished Belgian geologist, Omalius D’Halloy?

Also, I should be glad to be referred to the work of Broca, in which he states that “the small, brown, brachycephalic Celts are a mixed type” (*Science*, *ibid.*, p. 117). I have always understood Broca to maintain that they are a pure type, the real Celts of Cæsar’s time, and that they are now represented by the inhabitants of central France.

Again, what is Dr. Brinton’s authority for calling the type “of tall stature, with reddish or blond hair, and dolicocephalic crania,” the Kymric? Is not this the Scandinavian, or Teutonic type, of Penka, which he regards as the original Aryan type?

Dr. Brinton is surprised to find Professor Schaaflhausen of Bonn denying that “the bands who overran Italy in 393 B.C. were Celtic. Surely the title of their chiefs, *brennus*, ‘king,’ is evidence enough that they spoke a Celtic dialect” (*Science*, *ibid.*, p. 146). But speaking a dialect is no proof of blood relationship, and I suppose Schaaflhausen thinks that the followers of Brennus were really Galated, or of German origin. This is the problem discussed by Niebuhr, “*History of Rome*” (English translation), vol. ii., n. 1,169, in which the testimony of Celtic authors is quoted to show that the hair of the invading Celts was yellow, or red, while all Celtic peoples now have black hair. Niebuhr thinks that the law of permanency of physical constitution does not hold good for the hair, since now yellow or red hair has become uncommon among the Germans and Scandinavians in most parts. Thus it would seem that we can rely neither upon linguistic nor ethnological arguments wholly to settle the vexed question of the Celts.

HENRY W. HAYNES.

Boston, April 6.

#### AMONG THE PUBLISHERS.

THE famous geographer, Élisée Reclus, has just received, says *The Publishers’ Weekly*, an unusual honor from the Paris Geographical Society. It has long been one of the traditions of this society that its gold medal should be awarded only to explorers who make discoveries of the first importance. This year it has deviated from its time-honored rule and has awarded its medal to a writer instead of to an explorer. The honor was given to M. Reclus to commemorate the approaching completion of his great work, “*Nouvelle Géographie Universelle*.” The work is in eighteen large volumes, and Reclus is now at work on the last one. Reclus began this immense task in 1875. It is a monument of geographical learning, and, though intended for the people and written in a popular style, it is thoroughly scientific in spirit and treatment. It is an interesting fact that if it had not been for the intervention of Darwin and other great scientific men of England this greatest of all popular geographies would probably